

the skeleton of a bird is an interesting fact, and it sees its counterpart in the rudimentary limbs in such a lizard as *Ophisaurus ventralis*.

While engaged upon dissecting the eyes of adult Ravens (*Corvus corax sinuatus*), I have always found a firm osseous plate, of an elliptical outline, with a major axis of some 5 or 6 millimetres surrounding the entrance of the optic nerve, on the outer coat of the eye. In a 'Bulletin' which I have in the hands of the Smithsonian Institution for publication, I figure this structure, as well as the rudimentary metatarsal bone, to which I have alluded above. — R. W. SHUFELDT, *Fort Wingate, New Mexico*.

Abnormalities in the Ribs of Birds.—Those who have examined many series of skeletons are well aware that the number of ribs in any given species is liable to vary, and that an animal may possess a pair more than the normal number for the species, or that in exceptional cases a pair may be wanting.

The additional pair of ribs usually appears on the first lumbar vertebra, or what would normally be the first, although now and then a short, styli-form pair of pleurapophyses may be present on the seventh vertebra of mammals, or in fishes on the ex-occipitals.

The greater number of segments in the vertebral column, and the more generalized the animal, the greater seems the tendency to variation, and in the Urodele Batrachia even the number of dorsal vertebrae is extremely inconstant.

The following list of costal abnormalities, noted in a comparatively small number of skeletons, would seem to show that in birds the rib element is subject to frequent variations.

Galeoscoptes carolinensis with but five pairs of complete ribs, instead of the normal passerine number of six, the abnormality being caused by the lack of a hæmapophysis on the rib attached to the fifteenth vertebra. The styli-form rib on the fourteenth vertebra was also reduced in size.

Galeoscoptes carolinensis with seven pairs of ribs, a hæmapophysis connecting the ordinarily free rib of the fourteenth vertebra with the sternum.

Melanoptila glabrirostris and *Clivicola riparia*, each with a seventh pair of ribs with attached hæmapophyses on the second vertebra of the 'sacrum.'

Quiscalus purpureus and *Sturnella magna neglecta*, each with an additional pair of short slender ribs, devoid of hæmapophyses, on the second vertebra of the 'sacrum.' This is a rather curious coincidence, as the two birds are presumably nearly related. It is the more interesting from the fact that among birds the dorsal portion of the rib is the first to be suppressed, and instances are numerous—as among Raptores—where a pair of hæmapophyses is normally present without the slightest trace of corresponding pleurapophyses. An intermediate condition is found in some birds, *e. g.*, *Trochilus colubris* and *Cypselus apus*—a complete hæmapophysis supporting a pleurapophysis whose upper moiety is lacking.

Examination of the large series of sacra of *Alca impennis* in the collection of the U. S. National Museum shows that in this bird an extra (ninth)

pair of ribs was not infrequently present on the second 'sacral' vertebra. At some future day I hope to ascertain in what percentage of Great Auks this condition prevailed, but the most interesting fact is that when the additional pair of ribs is present there is usually at the same time a small parapophysis developed on the first true sacral vertebra, as if the rib-creating force had been felt still further down the line of vertebrae.

These abnormalities have been mentioned, as they seem to have a bearing on the reduction in the number of vertebrae which Baur, Balfour and Parker have shown has taken place among birds, and they may probably be regarded as the reappearances of ribs once normally present in the ancestral types of existing birds.—FREDERIC A. LUCAS, *Washington, D. C.*

CORRESPONDENCE.

[Correspondents are requested to write briefly and to the point. No attention will be paid to anonymous communications.]

The Sternum in the Solitary Sandpiper, and other Notes.

TO THE EDITORS OF THE AUK:—

Dear Sirs: Some little time ago, while looking over several skeletons of the Solitary Sandpiper (*Totanus solitarius* of the A. O. U check list), which I have in my private collection, I noticed that the sternum of this bird has but a single large notch on either side. Now the only two other allied species in our avifauna, so far as is known to me at present, thus constituted, are the Woodcock and Wilson's Snipe (*Gallinago delicata*), and I am uncertain about the genus *Macrorhamphus*, as I have not, as yet, looked up the point in the species therein contained. Possibly, too, *Totanus ochropus* may possess a sternum with but a pair of notches in it, and if that be the case, I am of the opinion that the character is very likely to be associated with other distinguishing points in the economy of these two birds, of ample importance, I think, to guarantee us in restoring for their reception, the genus *Rhyacophilus*, which change I propose in the present connection. Such forms as *Totanus flavipes* and *T. melanoleucus* have the usual *four-notched* sternum, as is the general rule among Limicoline birds.

To furnish certain comparative notes on this point, we find that Sir Richard Owen, in speaking of the sternum as it is found in certain birds of this order, says, in the second volume of his 'Comparative Anatomy and Physiology of Vertebrates,' on page 26, that "the woodcock (*Scolopax*) has a pair of notches, with the outer boundary slender, and shorter than the broad intermediatetract, the gambets (*Totanus*), avocets,